AP Statistics Study Sheet 2027

Formula Families, Decision Checklist, Worked Checks & Interactive Companion

Built for quick study	Built for correct method choice
Five revised units, formula-family map, conditions, and common traps.	Question -> variable type -> design -> conditions -> formula -> interpretation.

Interactive companion:
AP Statistics Formula Sheet 2027 - formulas, worked examples and tools
https://onlineinternetcafe.com/ap-statistics-formula-sheet/

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1. Five-Unit Study Map

The revised AP Statistics course for 2026-27 is organized into five units. A strong formula reference should match the current course instead of mixing in removed topics from older eight-unit materials.

Unit	Focus	Formula / skill emphasis
1	Exploring One-Variable Data & Collecting Data	Mean, sample SD, z-score, IQR, sampling and design
2	Probability, Random Variables & Probability Distributions	Probability rules, expected value, RV SD, binomial formulas
3	Inference for Categorical Data: Proportions	Sampling distributions, one-/two-proportion inference, chi-square
4	Inference for Quantitative Data: Means	Sampling distributions, one-/two-sample t, paired t
5	Regression Analysis	Prediction, residuals, correlation, r-squared, slope/intercept relationships

Current-course guardrail: geometric distributions, combining random variables, chi-square goodness-of-fit, and inference for a population regression slope are no longer current AP Statistics exam topics.

2. Formula Decision Checklist

Step	Question	Decision
1	Response variable	Categorical -> proportions/chi-square; quantitative -> means/regression.
2	Goal	Describe, estimate, test, compare, associate, or predict.
3	Structure	One sample, two independent groups, paired observations, two-way table, or two quantitative variables.
4	Design	Random sample, randomized experiment, observational study, convenience sample, etc.
5	Conditions	Independence, count/shape conditions, expected counts, or linear-model diagnostics.
6	Formula family	Choose the standard error/reference distribution that matches the design.
7	Interpretation	State the conclusion in context and within the permitted scope of inference.

When method choice is correct but calculation support is needed, use the **interactive AP Statistics Formula Sheet 2027**.

3. Descriptive Statistics & Regression

Relationship	Formula / structure	Use
Sample mean	x-bar = sum(x_i)/n	Arithmetic center; sensitive to outliers.
Sample SD	s = sqrt[sum((x_i-x-bar)^2)/(n-1)]	Sample spread in data units.
z-score	z=(x-mu)/sigma	Standardized location relative to a distribution.
Least-squares line	y-hat=a+bx	Predict y from x.
Residual	e=y-y-hat	Observed minus predicted.
r-squared	r^2	Proportion of y variation explained by the linear model.

4. Probability, Random Variables & Binomial

Relationship	Formula / structure	Use
Addition rule	P(A union B)=P(A)+P(B)-P(A intersection B)	Probability of A or B.
Conditional probability	P(A|B)=P(A intersection B)/P(B)	Probability of A within the restricted set B.
Discrete RV mean	mu_X=sum[xP(x)]	Long-run expected value.
Discrete RV SD	sigma_X=sqrt[sum((x-mu_X)^2P(x))]	Long-run spread.
Binomial probability	P(X=x)=C(n,x)p^x(1-p)^(n-x)	Exactly x successes.
Binomial mean / SD	mu=np; sigma=sqrt[np(1-p)]	Expected count and spread.

5. Inference Structure & Proportions

Relationship	Formula / structure	Use
Test statistic	(statistic-null parameter)/SE_null	Distance from null in null-model SE units.
Confidence interval	statistic +/- critical value x SE	Estimate with uncertainty.
One-proportion CI SE	sqrt[p-hat(1-p-hat)/n]	Uses observed p-hat.
Two-proportion CI SE	sqrt[p1-hat(1-p1-hat)/n1 + p2-hat(1-p2-hat)/n2]	Unpooled for intervals.
Pooled p-hat	(x1+x2)/(n1+n2)	Common estimate under H0:p1=p2.
Pooled test SE	sqrt[p-c-hat(1-p-c-hat)(1/n1+1/n2)]	For the usual equality test.

Exam trap: do not pool two proportions for a confidence interval. Pool only for the usual test of equality because the null hypothesis assumes a common proportion.

6. Means & Paired Data

Relationship	Formula / structure	Use
Sampling SD of x-bar	sigma/sqrt(n)	True sampling variability.
Estimated SE of x-bar	s/sqrt(n)	Used for t procedures when sigma unknown.
SE of two independent means	sqrt[s1^2/n1+s2^2/n2]	Two-sample t structure.
Paired difference	d_i=after_i-before_i	Create one list of differences.
Paired SE	s_d/sqrt(n)	Analyze paired differences with one-sample t logic.

Paired-data rule: matched observations are not independent groups. Convert to differences first.

7. Worked Verification Checks

One-proportion interval

118 of 200 students support a program. p-hat=0.59. SE about 0.0348. 95% CI about 0.59 +/- 1.96(0.0348) = (0.522, 0.658).

Two-proportion test

84/120 versus 70/110 gives p1-hat=0.700 and p2-hat about 0.636. Pooled p-hat_c=154/230 about 0.6696. Pooled null SE about 0.0621; z about 1.03.

One-sample mean interval

n=25, x-bar=31.2, s=8.0 gives SE=1.6. With df=24, t* about 2.064, so the 95% interval is about 31.2 +/- 3.30.

Paired t structure

For n=12 paired differences with d-bar=4.1 and s_d=5.2, SE about 1.50 and t about 2.73 for H0:mu_d=0.

Regression residual

For y-hat=18+2.4x, x=10 gives y-hat=42. If observed y=45, residual=3; the model underpredicted by 3.

Use the AP Statistics Formula Sheet 2027 for formula-specific explanations, conditions, worked examples, and interactive tools.

8. High-Frequency Errors to Avoid

Error	Correction
Using a formula before identifying the parameter	State the target and design first.
Pooling for a two-proportion confidence interval	Use the unpooled interval SE.
Treating paired data as two independent samples	Analyze pairwise differences.
Claiming causation from a random sample	Random sampling supports generalization, not causation.
Claiming generalization from random assignment alone	Random assignment supports causal comparison, not representativeness.
Calling the p-value P(H0 is true)	It measures how unusual the statistic is under the null model.
Equating significance with importance	Consider effect size, uncertainty, context, and practical consequences.
Extrapolating regression far outside the observed x-range	Flag the prediction as unsupported extrapolation.

9. Internet Archive Record Metadata

Recommended item title

AP Statistics Study Sheet 2027: Formula Families, Decision Checklist and Worked Checks

Recommended description

An independent open educational study resource for the revised AP Statistics course. It organizes formula families by purpose, connects them to the current five-unit framework, highlights method-selection and condition checks, and provides worked verification examples. The static PDF is complemented by an interactive AP Statistics formula resource with expanded explanations and tools.

Subject keywords

AP Statistics; AP Statistics study sheet; AP Statistics formulas 2027; AP Statistics formula guide; probability formulas; sampling distributions; statistical inference; confidence intervals; hypothesis testing; regression analysis

Interactive companion
https://onlineinternetcafe.com/ap-statistics-formula-sheet/

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